

length, the array containing all possible base sequences of that predetermined length and the base sequences being incapable of ligation to each other, wherein the contacting is carried out in the presence of ligase under conditions to ligate to the double-stranded portion of each DNA the probe bearing the base sequence complementary to the single-stranded DNA adjacent the double-stranded portion thereby to form an extended double stranded portion which is incapable of ligation to further probes; and

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- (c) removing all unligated probes; followed by the steps of:
  - (d) cleaving the ligated probes to release each label;
  - (e) recording the quantity of each label; and
  - (f) activating the extended double-stranded portion to enable ligation thereto;

wherein

(g) steps (b) to (f) are repeated in a cycle for a sufficient number of times to determine the sequence of each single-stranded DNA by determining the sequence of release of each label.

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33. (Twice Amended) A kit for sequencing a heterogeneous population of DNA templates, each immobilized in a unique amount in the same reaction zone, which kit comprises:

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- (a) an array of hybridization probes, each probe comprising a label cleavably attached to a known base sequence of predetermined length, the array

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containing all possible base sequences of that predetermined length and the base sequences being incapable of ligating to each other; and

(b) a means for resolving a measured quantity of a hybridized probe into quantities which correspond to unique amounts of the templates to which the probe hybridizes.

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